

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Patent Application

I hereby certify that this transmittal of the below described documents is being deposited with the United States Postal Service in an envelope bearing Express Mail Postage and an Express Mail label, with the below serial number, addressed to the Commissioner of Patents and Trademarks, Washington, D.C., 20231, on the below date of deposit.			
Express Mail Label No.:	EE588900597US	Name of Person Making the Deposit:	ANTHONY CHOU
Date of Deposit:	05/23/00	Signature of the Person Making the Deposit:	<i>Anthony Chou</i>



Inventor(s): David Creemer

Title: METHOD AND SYSTEM FOR DEVICE BOOTSTRAPPING VIA SERVER SYNCHRONIZATION

The Commissioner of Patents and Trademarks
Washington, D.C. 20231
Sir:

Transmittal of a Patent Application
(Under 37 CFR §1.53)

Transmitted herewith is the above identified patent application, including:

- ☒ Specification, claims and abstract, totaling 24 pages.
- ☐ Formal drawings, totaling _____ pages.
- ☒ Informal drawings, totaling 10 pages.
- ☒ Declaration and Power of Attorney.
- ☐ Information Disclosure statement.
- ☐ Form 1449
- ☐ Assignment(s)
- ☐ Assignment Recordation Form (duplicate)
- ☐ Preliminary Amendment

FEES DUE

The fees due for filing the specification pursuant to 37 C.F.R. § 1.16 and for recording of the Assignment, if any, are determined as follows:

CLAIMS					
	NO. OF CLAIMS		EXTRA CLAIMS	RATE	FEES
Basic Application Fee					\$690.00
Total Claims	16	Minus 20=	0	X \$18 =	\$0.00
Independent Claims	3	Minus 3=	0	X \$78=	\$0.00
If multiple dependent claims are presented, add \$260.00					\$0.00
Add Assignment Recording Fee of \$40.00 If Assignment document is enclosed					\$0.00
TOTAL APPLICATION FEE DUE					\$690.00

PAYMENT OF FEES

The full fee due in connection with this communication is provided as follows:

1. Not enclosed
 - ☐ No filing fee is to be paid at this time.
2. Enclosed
 - ☒ Filing fee
 - ☐ Recording assignment
 - ☐ Petition fee for filing by other than all the inventors or person on behalf of the inventor where inventor refused to sign or cannot be reached
 - ☐ For processing an application with specification in a non-English language
 - ☐ Processing and retention fee
 - ☐ Fee for international-type search report
 - ☒ The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No.: 23-0085. A duplicate copy of this authorization is enclosed.
 - ☒ A check in the amount of \$690.00
 - ☐ Charge any fees required or credit any overpayments associated with this filing to Deposit Account No.: 23-0085.

This application is filed pursuant to 37 C.F.R. § 1.53 in the name of the above-identified Inventor(s).

Please direct all correspondence concerning the above-identified application to the following address:

WAGNER, MURABITO & HAO LLP
Two North Market Street, Third Floor
San Jose, California 95113
(408) 938-9060

- ☒ This transmittal ends with this page.

Respectfully submitted,

Date: May 23, 2000

By: Ronald M. Pomeranke
Ronald M. Pomeranke
Reg. No. 43,009

PALM 2976 US P

UNITED STATES PATENT APPLICATION FOR
METHOD AND SYSTEM FOR DEVICE BOOTSTRAPPING VIA SERVER
SYNCHRONIZATION

Inventor:

David Creemer

Prepared by:

WAGNER, MURABITO & HAO LLP
TWO NORTH MARKET STREET
THIRD FLOOR
SAN JOSE, CALIFORNIA 95113
(408) 938-9060

METHOD AND SYSTEM FOR DEVICE BOOTSTRAPPING VIA SERVER

SYNCHRONIZATION

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

5 The present invention relates to the field of data processing systems. Specifically, the present invention relates to a method and apparatus for restoring basic functionality to a portable computer system which has lost the contents of volatile memory.

RELATED ART

10 As the components required to build a computer system have reduced in size, new categories of computer systems have emerged. One of the new categories of computer systems is the "palmtop" computer system. A palmtop computer system (otherwise known as a personal digital assistant or PDA) is a
15 computer that is small enough to be held in the hand of a user and can be "palm-sized." Most PDA computer systems are used to implement various Personal Information Management (PIM) applications such as an address book, a daily organizer and electronic notepads, to name a few.

20 It has proven useful to synchronize PDA computers to other computer systems. The synchronization process allows the two systems to exchange data or for the PDA to receive software from a host system. Conventionally, to synchronize to a desktop computer the user inserts the PDA into a cradle device, which is connected to the desktop computer system. The cradle
25 provides electrical communication between the PDA and the host system. In

this fashion, a single PDA may be synchronized with a single desktop.

Alternatively, a server may synchronize with several PDAs connecting via a modem.

5 As PDA computer systems are designed for portability, they are battery operated. Additionally, some conventional PDAs store key software in volatile memory (RAM). Therefore, if the PDA's battery should fail, the key software will be lost. Conventionally, to restore the PDA a user may install a new battery into the PDA and 'cold-boot' the PDA. Figure 1 shows a diagram for this
10 configuration. The user puts the PDA 100 into the cradle device 60 and synchronizes to a desktop computer system 56. The PDA 100 uses synchronization code stored in non-volatile memory (ROM) 103. The desktop 56 has synchronization code 20, as well as restore code 22. Restore code 22 is sent to PDA 100 and stored in RAM 102. In so doing, basic functionality is
15 restored to the PDA 100.

 However, many users carry their PDAs with them 'in the field.' For example, members of a sales force may each have a PDA that synchronizes with a common server. Restoring functionality to a PDA device in the field can
20 be problematic. For example, the desktop computer which the user conventionally synchronizes with the PDA to restore functionality may be turned off, or the user may be otherwise unable to make a connection to the desktop remotely.

Furthermore, the user may be unable to synchronize the PDA to the server. This is because in some conventional systems, even though much of the synchronization software resides on the host system (server), a certain amount resides in the PDA's volatile memory. Importantly, the PDA software which allows synchronization to a server, as opposed to a desktop, is sometimes conventionally stored in RAM in the PDA. Additionally, the software which facilitates logging into the server is sometimes stored in RAM in the PDA. Consequently, after a device battery failure, a user may be unable to synchronize the PDA to a server because this software is gone.

10

PDA's also store user entered data, as well as software applications in volatile memory. While the data may be backed up periodically on a server or desktop computer, the PDA may be unable to access this data without the server synchronization software or a connection to the desktop. Furthermore, without synchronization software the user may be unable to remotely reload the application software onto the PDA. If the user had access to a desktop computer system, he could perhaps reload the software and synchronize the data. However, when in the field, this option is generally unavailable.

15

20

PDA's generally store operating system software in non-volatile memory. However, patches may periodically be made to the operating system by adding code to volatile memory. When the device loses power, these operating system patches are lost. Again, the user faces the problem of how to regain basic functionality when at a remote location.

Additionally, a user who loses a PDA device and purchases a replacement device may face the same problems as a user whose PDA lost the contents of memory.

SUMMARY OF THE INVENTION

Therefore, it would be advantageous, then, to provide a method or system that allows a PDA computer system which is being used in-the-field and has lost the contents of volatile memory to regain basic functionality. What is also needed is a method for restoring data, application software, and operating system updates which are lost when the user is in the field. Furthermore, a method is needed to assist a user of a replacement PDA to load, in the field, the software and data which the original PDA contained. What is still further needed is a user friendly method which is available 24 hours a day.

Accordingly, the present invention provides a method and system that allows a PDA computer system that has lost the contents of volatile memory to regain basic functionality while still in the field. The present invention further provides a method and system for restoring data, application software, and operating system updates which are lost when the user is in the field.

Furthermore, the present invention provides a method and system to assist a user of a replacement PDA to replace the data and software which the original PDA contained--while still in the field. Additionally, the present invention is available to users 24 hours a day. The present invention provides these advantages and others not specifically mentioned above but described in the sections to follow.

A method and system for restoring basic functionality to a portable computer system via a server accessed remotely by telephone are disclosed. A user of a portable computer system which has lost data and software which was

held in volatile memory may connect to a server to restore basic functionality to the portable computer system. The server may be an enterprise or a web-based server. The connection may be made, for instance, over a 1-800 or a 1-900 telephone line. The server transfers sufficient software to the RAM of the portable computer for it to regain basic functionality. For example, synchronization software may be transferred to the portable computer. The portable computer may then use the synchronization software to synchronize via the server or host connection more fully in order to restore lost data or lost software applications that were stored on a server or on a host computer system. The step of synchronizing to restore lost data and applications may be done with a second server or, in another embodiment, with the same server which helped the portable computer system regain basic functionality. In one embodiment, the portable computer system can be a palmtop computer system.

In one embodiment, when the PDA first contacts the server, the server sends a menu of download options which may include: client server synchronization software, application programs, operating system patches, etc. The user may then synchronize to the client server to receive lost data and/or additional software. In another embodiment, all synchronizations are done in a single call to one server.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a prior art block diagram showing a PDA synchronizing to a desktop computer system.

5

Figure 2 is system illustration of an exemplary PDA computer system connected to other computer systems and the Internet via a cradle device.

Figure 3A is a top side perspective view of an exemplary PDA computer system.

10

Figure 3B is a bottom side perspective view of the exemplary PDA computer system of Figure 3A.

Figure 4 is an exploded view of the components of the exemplary PDA computer system of Figure 3A.

15

Figure 5 is a perspective view of the cradle device for connecting the exemplary PDA computer system to other systems via a communication interface.

20

Figure 6 is a logical block diagram of the exemplary PDA computer system in accordance with an embodiment of the present invention.

Figure 7 is a front view of a exemplary PDA computer system illustrating the display screen, digitizer regions and an exemplary menu in accordance with the present invention.

5 Figure 8 is a block diagram showing a PDA which has lost the contents of volatile memory synchronizing with a server, according to an embodiment of the present invention.

 Figure 9 is a block diagram detailing locations and transfers of software,
10 according to an embodiment of the present invention.

 Figure 10 is a flowchart of the process of restoring basic functionality to a portable computer system which has lost the contents of volatile memory, according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

In the following detailed description of the present invention, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be obvious to one skilled in the art that the present invention may be practiced without these specific details. In other instances well known methods, procedures, components, and circuits have not been described in detail as not to unnecessarily obscure aspects of the present invention.

NOTATION AND NOMENCLATURE

Some portions of the detailed descriptions which follow are presented in terms of procedures, steps, logic blocks, processing, and other symbolic representations of operations on data bits that can be performed on computer memory. These descriptions and representations are the means used by those skilled in the data processing arts to most effectively convey the substance of their work to others skilled in the art. A procedure, computer executed step, logic block, process, etc., is here, and generally, conceived to be a self-consistent sequence of steps or instructions leading to a desired result. The steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated in a computer system. It has proven convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like.

It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities. Unless specifically stated otherwise as apparent from the following discussions, it is appreciated that throughout the present invention, discussions utilizing terms such as "processing" or "computing" or "translating" or "calculating" or "determining" or "scrolling" or "displaying" or "recognizing" or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented as physical (electronic) quantities within the computer system's registers and memories into other data similarly represented as physical quantities within the computer system memories or registers or other such information storage, transmission or display devices.

EXEMPLARY PERSONAL DIGITAL ASSISTANT PLATFORM

Figure 2 illustrates a system 50 that can be used in conjunction with various embodiments of the present invention. It is appreciated that the present invention can operate with a variety of host computer and peripheral computer platforms and that system 50 is merely exemplary. System 50 comprises a host computer system 56 which can be a desktop unit as shown or a laptop system 58. Optionally, one or more host computer systems can be used within system 50. Host computer systems 58 and 56 are shown connected to a communication bus 54, which in one embodiment can be a serial communication bus, but could be of any of a number of well known designs, e.g., a parallel bus, Ethernet Local Area

Network (LAN), etc. Optionally, bus 54 can provide communication with the Internet 52 using a number of well known protocols.

Importantly, bus 54 is also coupled to a cradle 60 for receiving and initiating
5 communication with a peripheral computer system, e.g., a palm top ("palm-sized") portable computer system 100. Cradle 60 provides an electrical and mechanical communication interface between bus 54 (and anything coupled to bus 54) and the computer system 100 for two way communications. Computer system 100 also contains a wireless infrared communication mechanism 64 for sending and
10 receiving information from other devices.

Figure 3A is a perspective illustration of the top face 100a of one
embodiment of the exemplary PDA computer system. The top face 110a contains a display screen 105 surrounded by a bezel or cover. A removable stylus 80 is
15 also shown. The display screen 105 is a touch screen able to register contact between the screen and the tip of the stylus 80. The stylus 80 can be of any material to make contact with the screen 105. The top face 100a also contains one or more dedicated and/or programmable buttons 75 for selecting information and causing the computer system to implement functions. The on/off button 95 is
20 also shown.

Figure 3A also illustrates a handwriting recognition pad or "digitizer"
containing two regions 106a and 106b. Region 106a is for the drawing of
alphabetic characters therein (and not for numeric characters) for automatic
25 recognition and region 106b is for the drawing of numeric characters therein (and

not for alphabetic characters) for automatic recognition. The stylus 80 is used for stroking a character within one of the regions 106a and 106b. The stroke information is then fed to an internal processor for automatic character recognition. Once characters are recognized, they are typically displayed on the screen 105 for
5 verification and/or modification.

Figure 3B illustrates the bottom side 100b of one embodiment of the exemplary PDA computer system that can be used in accordance with various embodiments of the present invention. An optional extendible antenna 85 is
10 shown and also a battery storage compartment door 90 is shown. A communication interface 108 is also shown. In one embodiment of the present invention, the serial communication interface 108 is a serial communication port, but could also alternatively be of any of a number of well known communication standards and protocols, e.g., parallel, SCSI, Firewire (IEEE 1394), Ethernet, etc.

15 Figure 4 is an exploded view of the exemplary PDA computer system 100 in accordance with one implementation. System 100 contains a front cover 210 having an outline of region 106 and holes 75a for receiving buttons 75b. A flat panel display 105 (both liquid crystal display and touch screen) fits into front cover
20 210. Any of a number of display technologies can be used, e.g., LCD, FED, plasma, etc., for the flat panel display 105. A battery 215 provides electrical power. A contrast adjustment (potentiometer) 220 is also shown. On/off button 95 is shown along with an infrared emitter and detector device 64. A flex circuit 230 is shown along with a PC board 225 containing electronics and logic (e.g., memory,
25 communication bus, processor, etc.) for implementing computer system

functionality. The digitizer pad is also included in PC board 225. A mid-frame 235 is shown along with stylus 80. Position adjustable antenna 85 is shown.

A radio receiver/transmitter device 240 is also shown between the mid-frame and the rear cover 245 of Figure 4. The receiver/transmitter device 240 is coupled to the antenna 85 and also coupled to communicate with the PC board 225. In one implementation the Mobitex wireless communication system is used to provide two way communication between system 100 and other networked computers and/or the Internet via a proxy server.

Figure 5 is a perspective illustration of one embodiment of the cradle 60 for receiving the exemplary PDA computer system 100. Cradle 60 contains a mechanical and electrical interface 260 for interfacing with serial connection 108 (Figure 2B) of computer system 100 when system 100 is slid into the cradle 60 in an upright position. Once inserted, button 270 can be pressed to initiate two way communication between system 100 and other computer systems coupled to serial communication 265.

Figure 6 illustrates circuitry of computer system 100, some of which can be implemented on PC board 225. Computer system 100 includes an address/data bus 99 for communicating information, a central processor 101 coupled with the bus for processing information and instructions, a volatile memory 102 (e.g., random access memory RAM) coupled with the bus 99 for storing information and instructions for the central processor 101 and a non-volatile memory 103 (e.g., read only memory ROM) coupled with the bus 99 for storing static information and

instructions for the processor 101. Computer system 100 also includes an optional data storage device 104 (e.g., memory stick) coupled with the bus 99 for storing information and instructions. Device 104 can be removable. As described above, system 100 also contains a display device 105 coupled to the bus 99 for
5 displaying information to the computer user. PC board 225 can contain the processor 101, the bus 99, the ROM 103 and the RAM 102.

Also included in computer system 100 of Figure 6 is an optional alphanumeric input device 106 which in one implementation is a handwriting
10 recognition pad ("digitizer") having regions 106a and 106b (Figure 3A), for instance. Device 106 can communicate information and command selections to the central processor 101. System 100 also includes an optional cursor control or directing device 107 coupled to the bus 99 for communicating user input information and command selections to the central processor 101. In one
15 implementation, device 107 is a touch screen device incorporated with screen 105. Device 107 is capable of registering a position on the screen 105 where the stylus makes contact. The display device 105 utilized with the computer system 100 may be a liquid crystal device, cathode ray tube (CRT), field emission device (FED, also called flat panel CRT) or other display device suitable for creating
20 graphic images and alphanumeric characters recognizable to the user. In the preferred embodiment, display 105 is a flat panel display.

Signal communication device 108, also coupled to bus 99, can be a serial port for communicating with the cradle 60. Device 108 can also include an
25 infrared communication port.

Figure 7 is a front view of the exemplary PDA computer system 100 with a menu bar 305 open displaying a pull down window. Also shown are two regions of digitizer 106a and 106b. Region 106a is for receiving user stroke data for alphabet characters, and typically not numeric characters, and region 106b is for receiving user stroke data for numeric data, and typically not for alphabetic characters. Physical buttons 75 are also shown. Although different regions are shown for alphabetic and numeric characters, the present invention is also operable within a single region that recognizes both alphabetic and numeric characters.

METHOD AND SYSTEM FOR RESTORING BASIC FUNCTIONALITY TO A DEVICE WHICH HAS LOST THE CONTENTS OF VOLATILE MEMORY

PDA devices contain synchronization code in non-volatile memory which can be used to synchronize to a desktop computer. The present invention takes advantage of this code to synchronize with a server that appears to the PDA as a desktop computer. Thus, the server functions as a publicly available desktop computer with which to synchronize, in the field, PDAs which have lost the contents of volatile memory or PDAs which were purchased as replacements.

Figure 8 shows a block diagram of a PDA computer 100 connected to a bootstrap server 806 via a modem 802. The PDA 100 pictured has lost all software in volatile memory (RAM) 102 due e.g., to battery failure and hence must rely on software stored in non-volatile memory (ROM) 103. The synchronization logic software stored in ROM 103 is ordinarily used to

synchronize to a desktop computer system 56 (Figure 2). However, in the present invention, the synchronization logic stored in ROM 103, referred to as the core set of communication functions 814, is used to connect to and synchronize with a remote bootstrap server 806.

5

The PDA 100 stores the software ordinarily used to synchronize with a server in volatile memory 102. As the PDA 100 has lost the contents of volatile memory 102, a connection to the bootstrap server 806 would be impossible under the conventional method of using RAM 102 based software. However, 10 the present invention allows the PDA 100 to connect to and synchronize with the server 806 by using the core set of communication functions 814, which is ordinarily used to synchronize with a desktop computer 56. The illustrated bootstrap server 806 thus appears to the PDA 100 as a desktop 56. In this fashion, the PDA 100 is able to regain the basic functionality that was lost when 15 the battery 215 (Figure 4) fails.

Referring still to Figure 8, bootstrap server 806 has bootstrap synchronization software 808, which is used to synchronize with the PDA 100 as a desktop system 56 ordinarily would when the battery 215 fails. (That is, 20 with ROM 103 based software.) Server also has an extended set of communication functions 810, which may be sent to the PDA 100 to help it regain basic functionality. In one embodiment, the bootstrap server 806 also has enterprise software 812 which may be sent to the PDA 100 as well. Enterprise software may encompass: enterprise server synchronization 25 software, application programs, backed-up data, etc. It will be understood that

any subset of the enterprise software 812 may be present on the bootstrap server 806. The present invention transfers sufficient software from the bootstrap server 806 such that the PDA 100 regains basic functionality and may once again connect to and synchronize with various servers.

5

Frequently, PDAs 100 used in the field connect to an enterprise server. For example, members of a sales force may synchronize their PDAs 100 to the same corporate server. These PDAs 100 frequently have special enterprise server synchronization software, which may be specially adapted to function with the enterprise server. Because this software is installed after manufacture of the PDA 100, it is often stored in RAM 102. In this case, this software must be restored after a battery 215 failure. Additionally, the PDA may need to restore a tool (Figure 9, 902) and an associated software application, such as a spreadsheet program. For example, the PDA may be used to enter inventory data which is transferred to a remote enterprise server, wherein the PDA has application software designed to facilitate inventory data entry.

10

15

Figure 9 is a block diagram of a PDA showing locations of key software and software transfers which occur, according to one embodiment of the present invention. The present invention allows the user to first synchronize to the bootstrap server 806 using ROM 103 based software. In one embodiment, the PDA 100 to bootstrap server 806 connection 920 is made over a telephone line. In synchronizing, enterprise server synchronization software 812 is transferred to the PDA 100 and stored in RAM 102. Thus, the PDA 100 may then synchronize to the enterprise server 906 to restore the tool 902, the

20

25

associated application program 904, and backed up data 908. The PDA 100 to enterprise server 906 connection 922 may be made via the Internet or without making an Internet connection. In another embodiment, all software resides on the bootstrap server 806. In one embodiment, bootstrap server 806 contains
5 operating system patches, which the PDA 100 may request.

Figure 10 shows a flowchart 1000 of the steps of restoring functionality to a PDA 100, according to an embodiment of the present invention. In step 1005, a PDA computer 100 which has lost the contents of volatile memory 103
10 establishes a connection via a modem 802 to a server 806. In step 1008, the PDA 100 must use only code which was stored in non-volatile memory 103; therefore, the bootstrap server 806 uses synchronization code which is compatible with the code which the PDA 100 has stored in ROM 103. The bootstrap server 806 recognizes the PDA's 100 attempt at synchronization as a
15 call for help and sends back a menu of options, in step 1010.

In step 1015, the device 100 selects which software it wishes to receive from the server 806. In step 1020, the server 806 sends back the requested software, which the PDA 100 installs in its volatile memory 102. After installing
20 this first software, the PDA 100 regains basic functionality. Next, in step 1025 the PDA user decides whether to contact an enterprise server 906. If so, in step 1030, the PDA connects to the enterprise server 906, using the enterprise server synchronization code 812 which was transferred from the bootstrap server 806 and stored in RAM 102. The connection to the enterprise server 906
25 may be made with or without a connection to the Internet 52. In another

embodiment, it is not necessary to call a new number, as all synchronizations are done in one call. It will be understood to those of ordinary skill in the art that other possible ways exist for restoring the device's functionality, once the connection has been made to the bootstrap server 806.

5

In step 1035, the user decides whether data needs to be restored. If so, in step 1040 the PDA 100 synchronizes to the server which contains the backed up data. This could be either the bootstrap server 806 or the enterprise server 906, depending on the embodiment.

10

The preferred embodiment of the present invention, a method and system for restoring basic functionality to a portable computer which has lost the content of volatile memory, is thus described. While the present invention has been described in particular embodiments, it should be appreciated that the present invention should not be construed as limited by such embodiments, but rather construed according to the below claims.

15

CLAIMS

What is claimed is:

- 5 1. A data processing system comprising:
 - a) a bootstrap server having an extended set of communication functions stored thereon;
 - b) a personal digital assistant having a core set of communication functions stored in non-volatile memory thereon, said core set of communication
 - 10 functions operable to allow said personal digital assistant to communicate with said bootstrap server;
 - c) wherein said bootstrap server is for transferring said extended set of communication functions to said personal digital assistant; and
 - d) an enterprise server operable to connect to said personal digital
 - 15 assistant, wherein said personal digital assistant and said enterprise server communicate and transfer information, with said personal digital assistant using said extended set of communication functions.
2. The data processing system of Claim 1 wherein said bootstrap server
- 20 and said personal digital assistant are operable to communicate via a telephone line.
3. The data processing system of Claim 1 wherein said personal digital assistant communicates with said enterprise server over the Internet.

4. The data processing system of Claim 1 wherein said core set of communication functions is synchronization logic.

5 5. A method of restoring basic functionality to a device comprising the steps of:

a) making a connection between a bootstrap server and a portable computer system;

b) synchronizing said bootstrap server with said portable computer system, wherein said server uses synchronization software which is compatible with a core set of communication functions stored in said portable computer system's non-volatile memory;

c) transferring first software from said bootstrap server to a volatile memory unit of said portable computer system, wherein said portable computer system regains basic functionality for connecting to an enterprise server; and

d) said portable computer system connecting to and transferring information with said enterprise server using said first software.

6. The method of Claim 5 wherein step c) comprises the step of:

c1) transferring an extended set of communication functions from said bootstrap server to said portable computer system.

7. The method of Claim 5 wherein step a) comprises the step of:

a1) making said connection between said bootstrap server and said portable computer system using a telephone line.

8. The method of Claim 5 wherein step d) comprises the step of:

d1) said enterprise server transferring data to said portable computer system, wherein said data was backed up on said enterprise server from a previous synchronization between said enterprise server and said portable computer system.

9. The method of Claim 5 wherein said portable computer system is a personal digital assistant.

10. The method of Claim 5 wherein step d) comprises the step of:

d1) said portable computer system connecting to and transferring information with said enterprise server via the Internet, said portable computer system using said first software.

11. A server for restoring basic functionality to a portable computer system comprising:

a bootstrap server having bootstrap synchronization software stored thereon, said bootstrap synchronization software operable to allow a portable computer system to synchronize with said bootstrap server by using non-volatile memory based synchronization software stored in non-volatile memory on said portable computer system, wherein said bootstrap server appears to said portable computer system as a desktop computer system; and

a modem coupled to said bootstrap server, said modem for allowing said portable computer system to communicate with said bootstrap server.

12. The server of Claim 11 further comprising:

enterprise synchronization software stored thereon, said enterprise
synchronization software for allowing said portable computer system to
5 synchronize to an enterprise server when said enterprise synchronization
software is used by said portable computer system.

13. The server of Claim 11 further comprising:

application software stored on said bootstrap server, wherein said
10 bootstrap server is for transferring said application software to said portable
computer system.

14. The server of Claim 11 further comprising:

a software tool stored on said bootstrap server, wherein said bootstrap
15 server is for transferring said software tool to said portable computer system.

15. The server of Claim 11 further comprising:

data from a previous synchronization with said portable computer system
stored on said bootstrap server, wherein said bootstrap server is for transferring
20 said data to said portable computer system.

16. The server of Claim 11 wherein said portable computer system is a
personal digital assistant.

ABSTRACT OF THE INVENTION

A method and system for restoring basic functionality to a portable computer system via a server accessed remotely by telephone. A user of a portable computer system which has lost data and software which was held in volatile memory may connect to a server to restore basic functionality to the portable computer system. The server may be an enterprise or a web-based server. The connection may be made, for instance, over a 1-800 or a 1-900 telephone line. The server transfers sufficient software to the RAM of the portable computer for it to regain basic functionality. For example,

- 5
- 10
- 15
- synchronization software may be transferred to the portable computer. The portable computer may then use the synchronization software to synchronize via the server or host connection more fully in order to restore lost data or lost software applications that were stored on a server or on a host computer system. The step of synchronizing to restore lost data and applications may be done with a second server or, in another embodiment, with the same server which helped the portable computer system regain basic functionality. In one embodiment, the portable computer system can be a palmtop computer system.

FIG. 1 is a block diagram of a system 100 in accordance with the present invention. The system 100 includes a PDA 100, a Cradle 60, and a Desktop 56. The PDA 100 includes RAM 102 and ROM 103. The Desktop 56 includes Restore Code 22 and Sync Code 20. The Cradle 60 is connected to the PDA 100 and the Desktop 56.

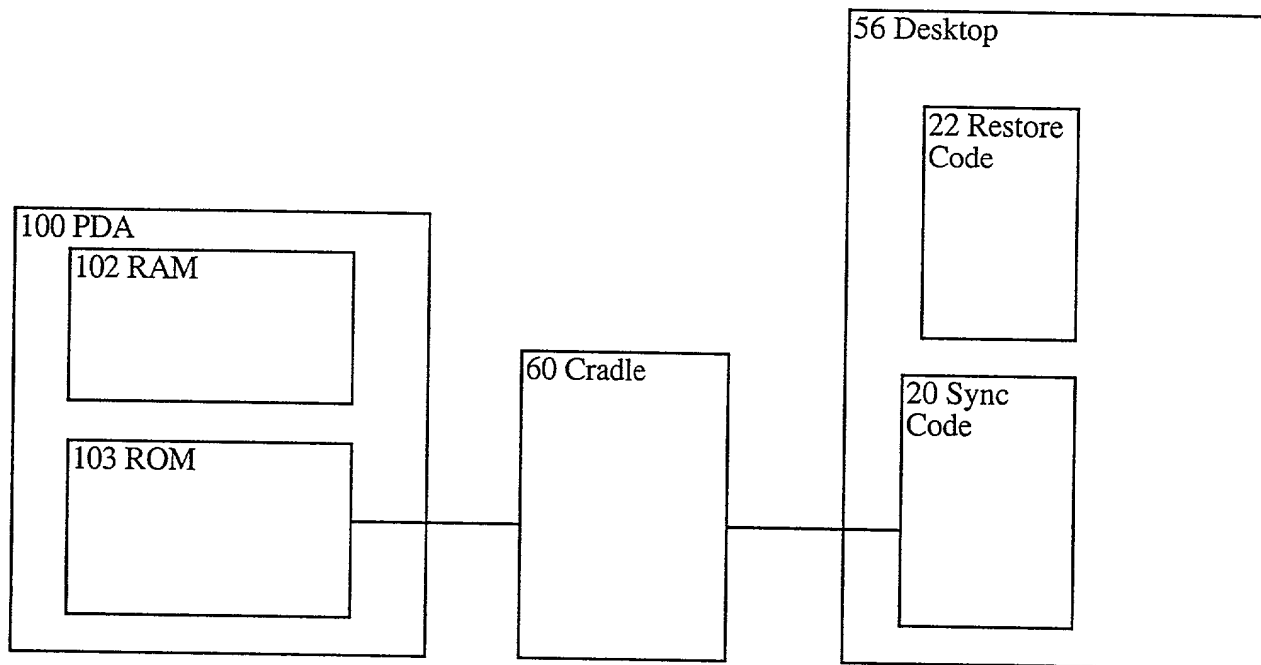


FIGURE 1
Prior Art

50

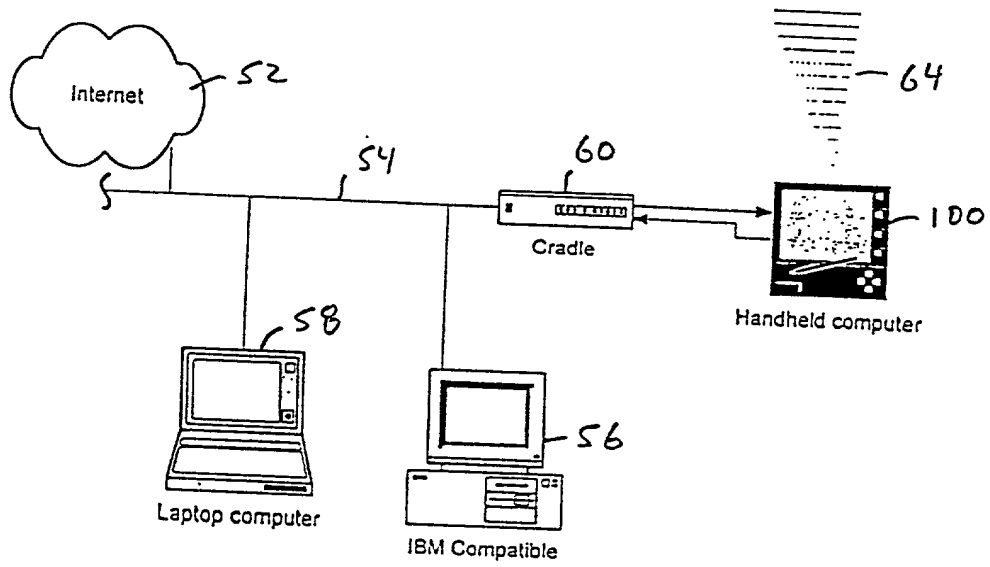


FIGURE 2

100a

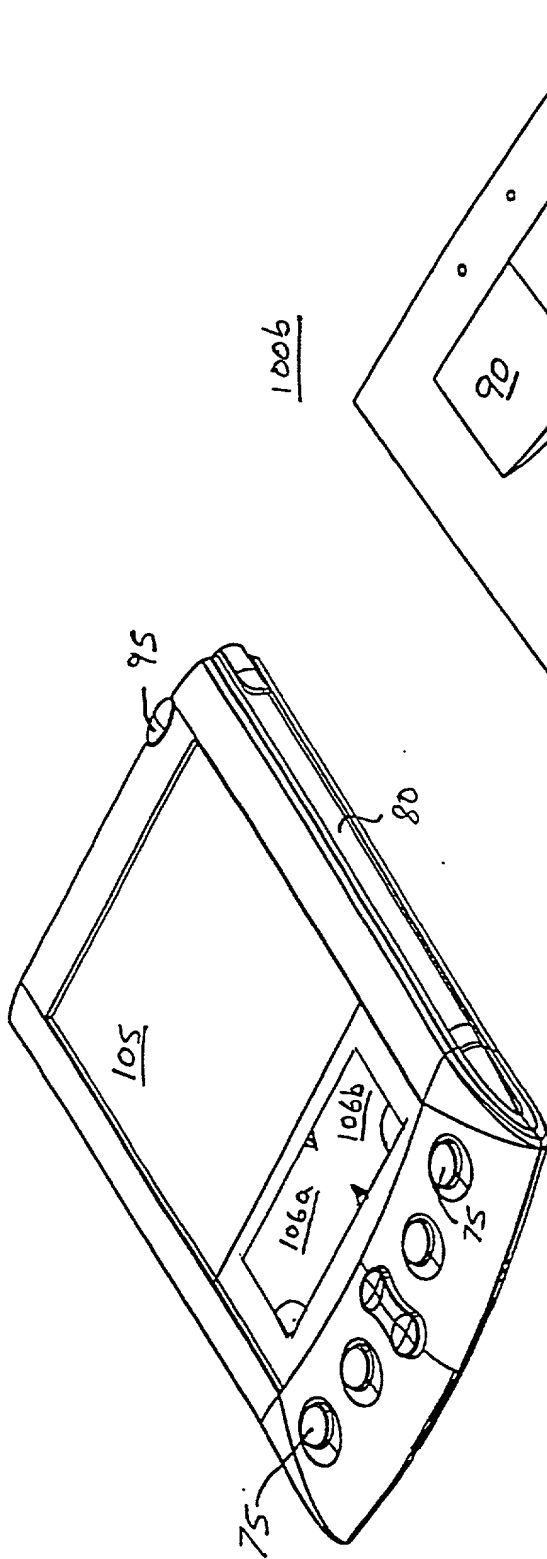


FIGURE 3A

100b

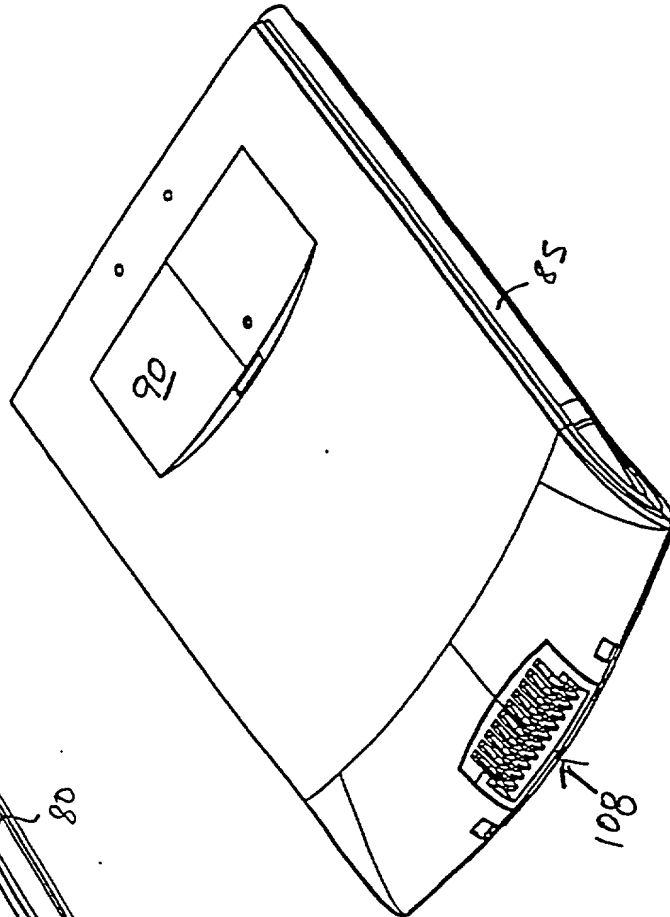


FIGURE 3B

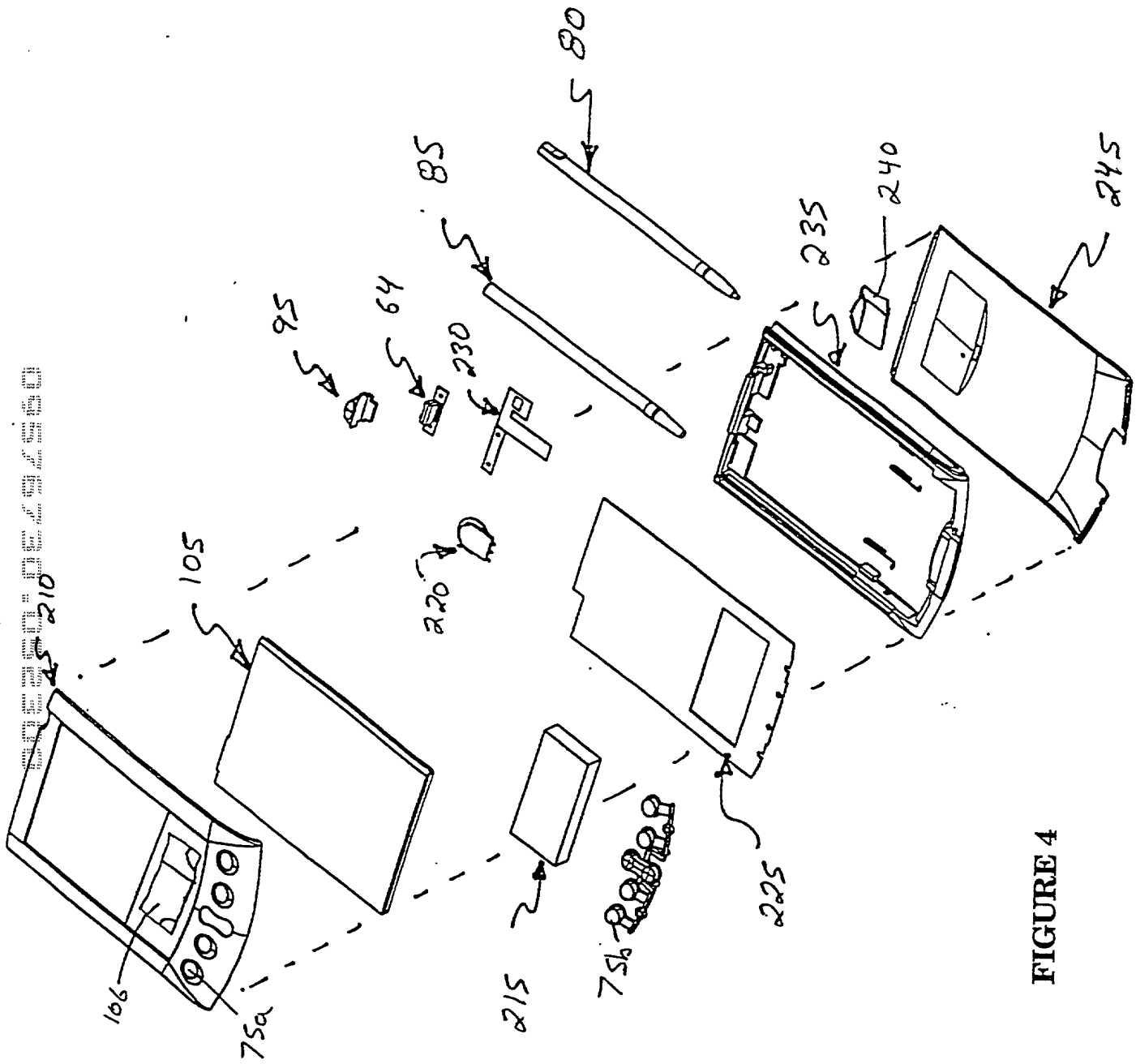


FIGURE 4

[illegible][illegible]

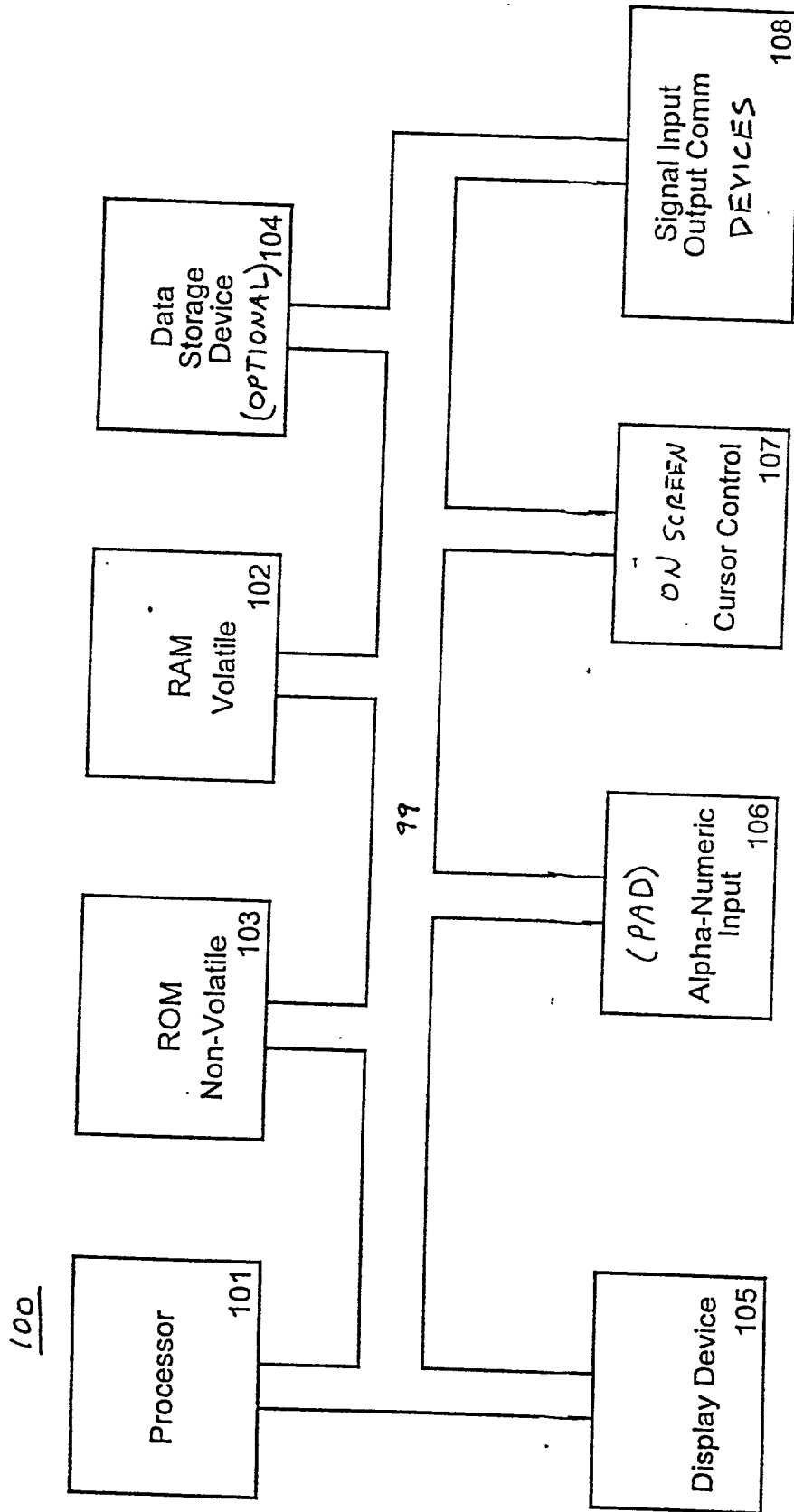


FIGURE 6

100

305

106a

106b

75

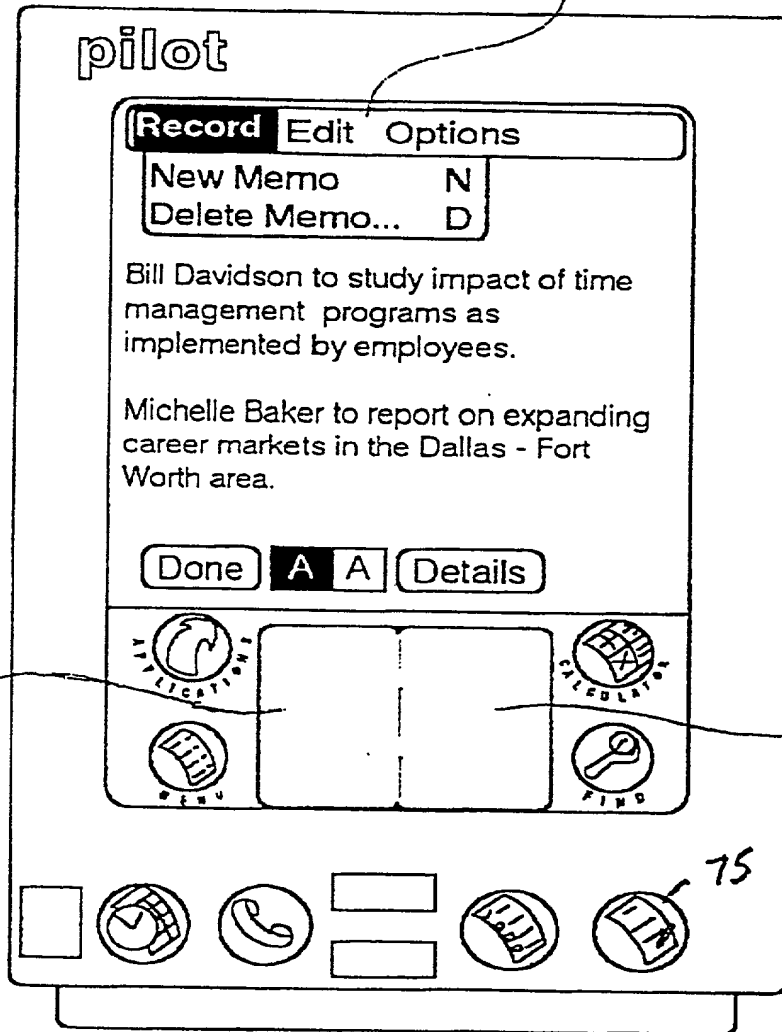


FIGURE 7

FIG. 8 is a block diagram of a system architecture for a PDA and a Bootstrap Server. The PDA (100) includes a ROM (103) and a RAM (102). The ROM (103) contains a Core Set of Communication Functions (814). The Bootstrap Server (806) includes Bootstrap Sync Software (808), an Extended Set of Communication Functions (810), and Enterprise Software (812). The PDA (100) is connected to the Bootstrap Server (806) via a Modem (802) and another Modem (804).

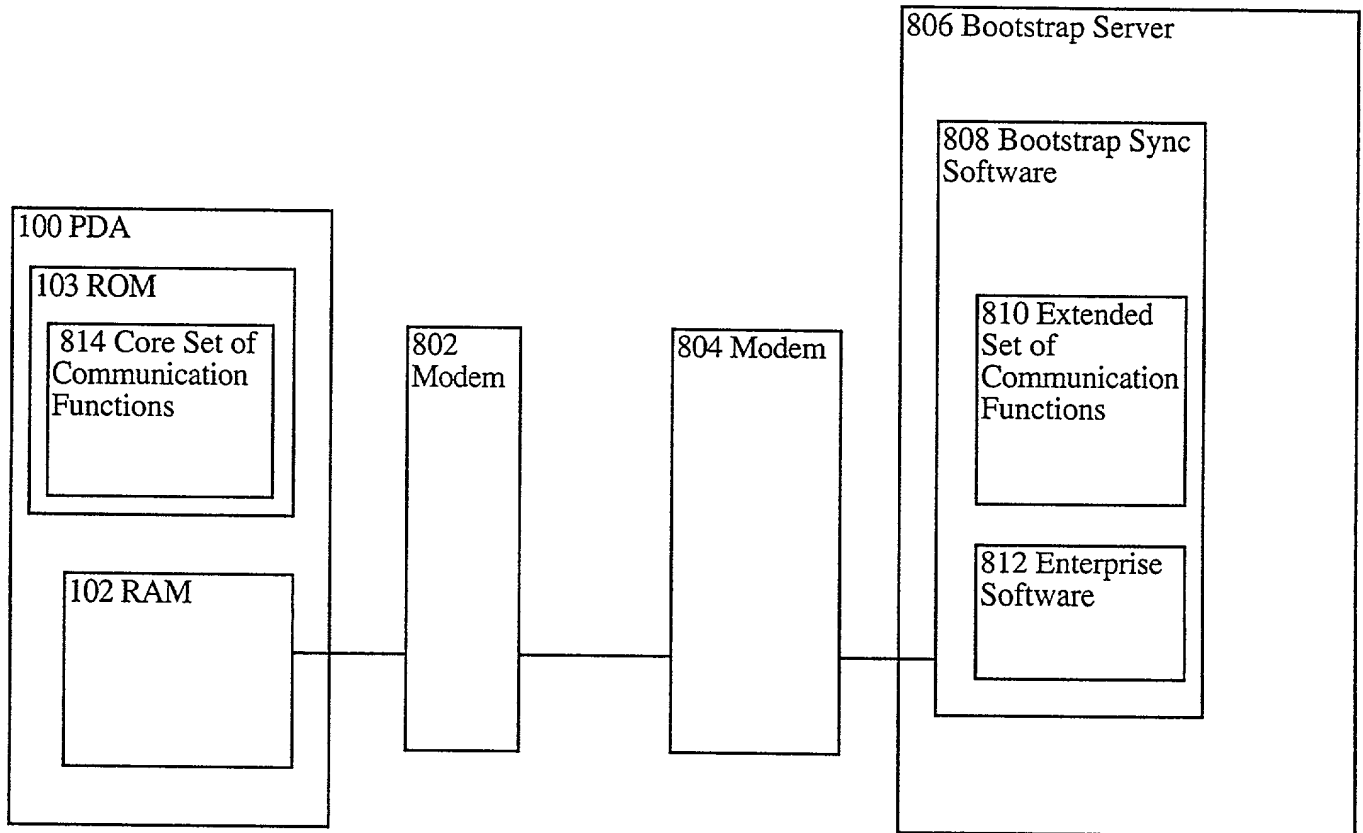


FIGURE 8

FIG. 9 is a block diagram of a system architecture. The system includes a PDA (100) and two servers (806 and 906). The PDA (100) contains ROM (103) and RAM (102). The Bootstrap Server (806) contains Enterprise 1 Server Sync Code (812), Enterprise 2 Server Sync Code (812), Enterprise 3 Server Sync Code (812), and Enterprise 4 Server Sync Code (812). The Enterprise Server (906) contains the 904 Application Program, 902 Tool, and 908 Backed-up Data. Arrows indicate data flow: 920 from ROM (103) to Bootstrap Server (806), and 922 from Bootstrap Server (806) to RAM (102). Arrows also point from the 904 Application Program and 902 Tool to RAM (102).

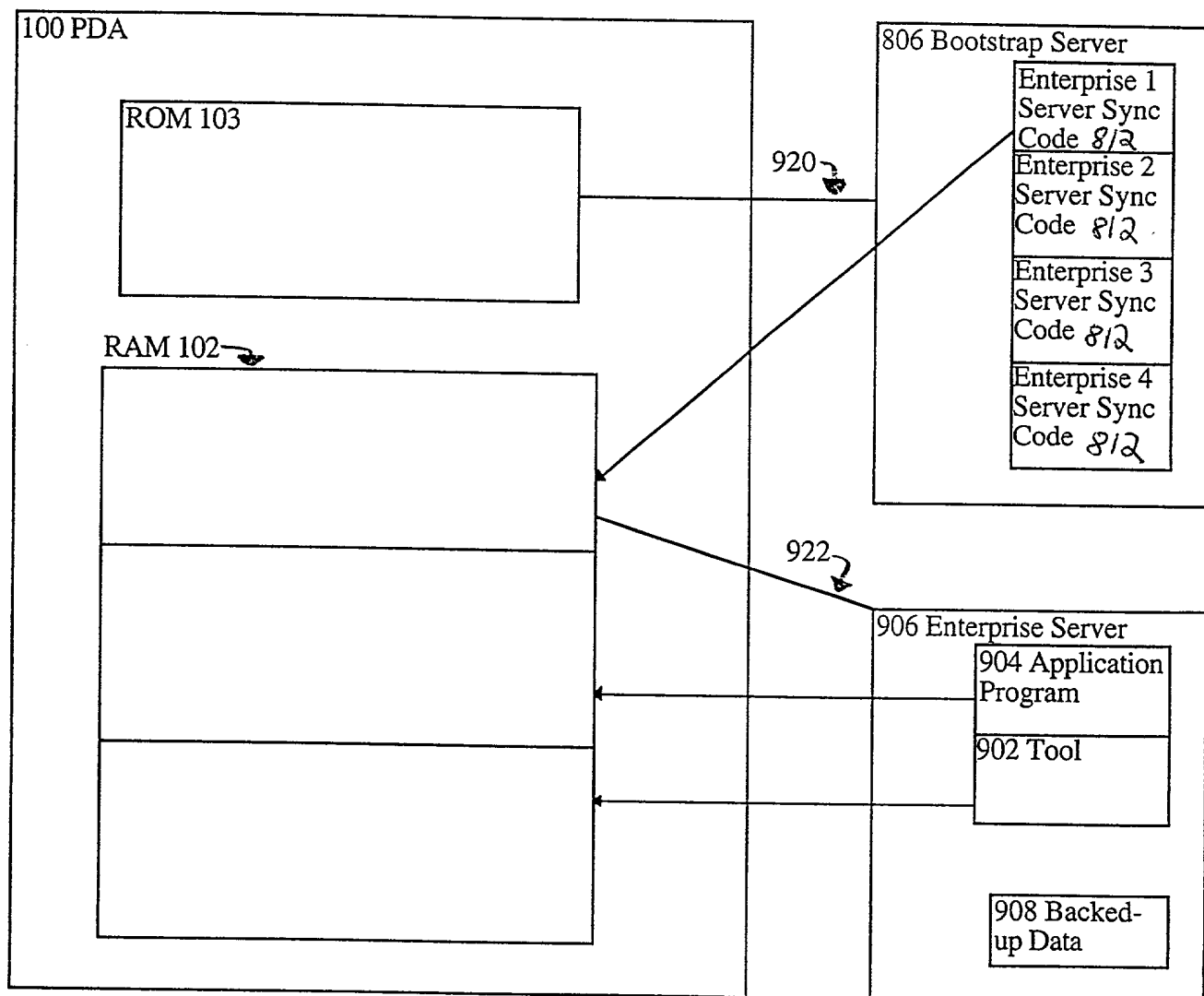


FIGURE 9

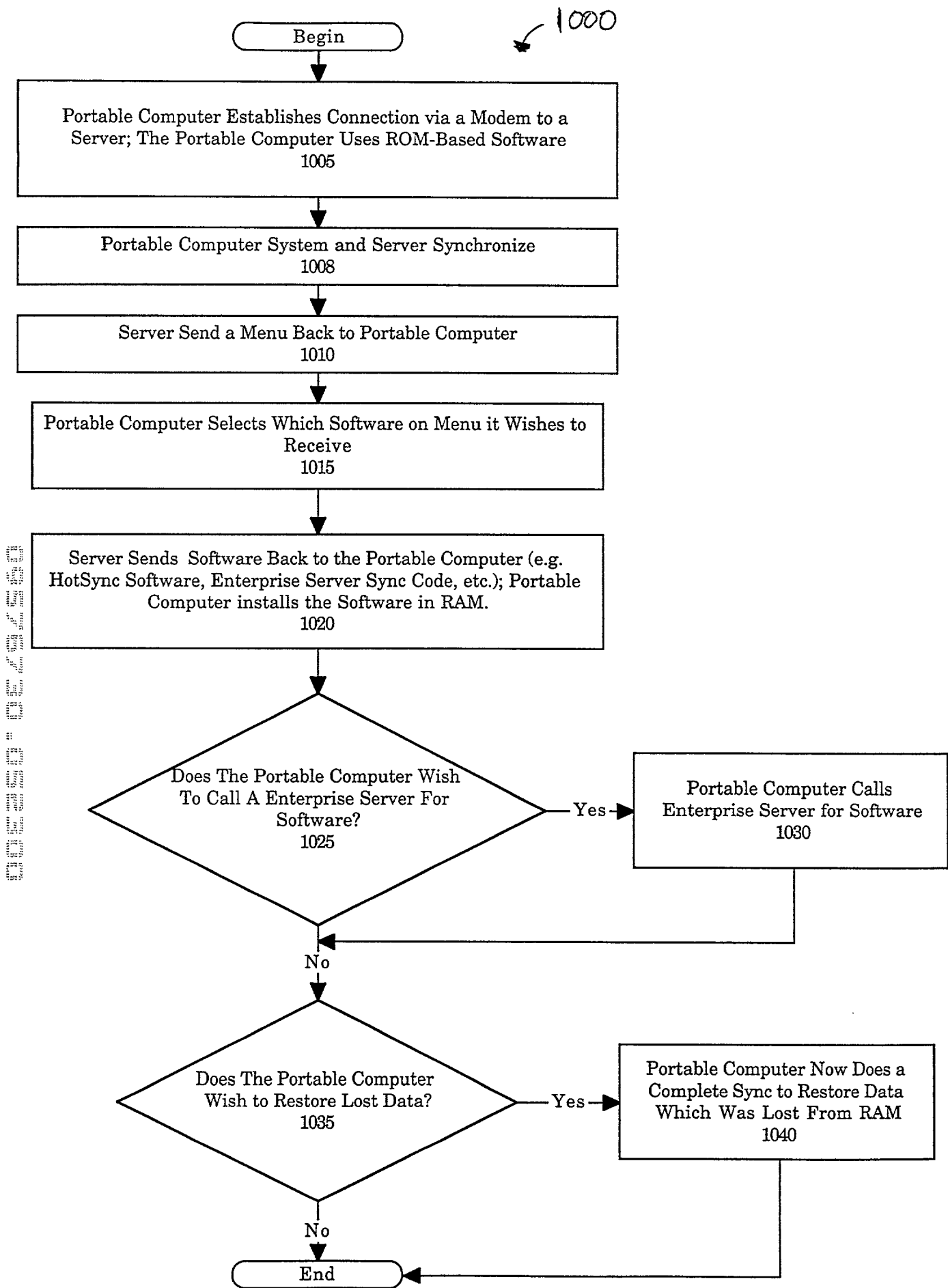


FIGURE 10

Declaration and Power of Attorney for a Patent Application

Declaration

As below named inventor, I hereby declare that my residence post office address, and citizenship are as stated below my name. Further, I hereby declare that I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD AND SYSTEM FOR DEVICE BOOTSTRAPPING VIA SERVER SYNCHRONIZATION

the specification of which:

☒ is attached hereto, or
 was filed on as application serial no. : and
 was amended on

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above; and

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

Foreign Priority Claim

I hereby claim foreign priority benefits under Title 35, United States Code Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Number	Country	Date Filed	Priority Claimed
..... yes no
..... yes no

U.S. Priority Claim

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Serial Number	Filing Date	Status (patented/pending/abandoned)
.....
.....

Power of Attorney

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent Trademark Office connected therewith.

James P. Hao	Registration No.: 36,398
Anthony C. Murabito	Registration No.: 35,295
John P. Wagner	Registration No.: 35,398
Glenn D. Barnes	Registration No.: 42,293
Thomas M. Catale	Registration No.: P-46,434
Jose S. Garcia	Registration No.: 43,628
Kenneth N. Glass	Registration No.: 42,587
Wilfred H. Lam	Registration No.: 41,923
Patrick W. Ma	Registration No.: 44,215
Christopher R. Novak	Registration No.: 42,041
Ronald M. Pomerence	Registration No.: 43,009
William A. Zarbis	Registration No.: 46,120

Send Correspondence to:

WAGNER, MURABITO & HAO LLP
 Two North Market Street
 Third Floor
 San Jose, California 95113
 (408) 938-9060

Signatures

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Sole/First Inventor: David Creemer

Inventor's Signature _____ Date _____
 Residence _____ Citizenship _____
 (City State)

P.O. Address _____

Full Name of Second/Joint Inventor: _____

Inventor's Signature _____ Date _____
 Residence _____ Citizenship _____
 (City State)

P.O. Address _____